been forced to employ lay anesthetists because no professional man interested in this specialty was present in the community. It seems to me that a greater effort should be taken to interest interns in anesthesia. Especially should they be instructed thoroughly in the use of gas anesthetics. Special short courses in anesthesia could be arranged in the larger clinics, where those who wished, could receive training. This would be far more instructive than a demonstration of apparatus by commercial houses whose interest terminates with the sale of a gas machine, the buyer using the apparatus on his own responsibility.

Two or three small communities, situated a few miles apart, might keep one trained anesthetist busy. Or, as suggested before, some other line could be pursued in conjunction with anesthesia. An endeavor should at least be made to increase the knowledge of anesthesia among medical men so that better anesthesia will be more generally available in the smaller localities.

Bank of Italy Building.

TOTI-MOSHER OPERATION IN OBSTRUCTION OF THE NASOLACHRYMAL DUCT*

REPORT OF CASES

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UNTIL recent years dacryocystectomy has been the only relief we have been able to offer patients with a chronic suppurative dacryocystitis. In simple epiphora, without infection, due to obstruction of the nasolachrymal duct, a small percentage of patients are relieved by probing. In the majority of these cases no permanent relief is obtained; they are benefited for only a short time and then return with their former symptoms.

It has been said that dacryocystectomy gives satisfactory results. It is true that the chronic inflammation of the conjunctiva is relieved by this procedure, the eye is no longer bathed in pus, and under ordinary circumstances there is no epiphora. Most of these patients, however, are not altogether happy. When out of doors on a cold day, or when the wind is blowing, they complain of the annoyance of the eye watering. In some instances this is sufficient to warrant partial extirpation of the lachrymal gland.

We feel that an operation of the Toti-Mosher type, in properly selected cases, gives excellent results, and from the patient's point of view, far superior results to extirpation of the sac. There are, however, certain contraindications that must be kept in mind.

It is absolutely essential that there be no stricture between the punctum and the sac, as this will, for obvious reasons, produce a failure. It has been surprising to see the relatively large number of these cases in which this type of stricture is present. It is desirable to avoid slitting the canaliculi.

In cases where cleaning up a lachrymal infection is a preparation for a cataract extraction, this type of operation is not indicated. Following the Toti-Mosher, there is no doubt but that the conjunctival sac is more exposed to possible infection from the nose. Consequently, it would seem poor judgment to perform, preliminary to a cataract extraction, an operation that would increase the hazard of infection.

From our small series of cases, we have found that a chronic suppurative dacryocystitis of long standing is no contraindication. In our first patient, a boy of ten, the chronic suppurative process had been present for four years. In several instances this condition had persisted for three or four years. In one patient there was a history of a bilateral chronic dacryocystitis of eight years' duration. The enlarged thickened sac does not complicate the operation, but rather facilitates the finding of the sac.

Judging from our one failure, extirpation of the remaining portion of the lachrymal sac is not complicated by a previously performed Toti-Mosher operation,

While these patients as a rule consult the ophthalmologist, we feel teamwork with a rhinologist has a decided advantage. A large portion of the work is primarily nasal, and in a certain percentage some preliminary intranasal procedure is necessary. Observation has shown that where these patients are operated upon by the ophthalmologist there is a much larger percentage of poor results. This is due primarily to a failure to carry out the details of the nasal portion of the operation. The ophthalmologist is, however, more competent to decide upon the advisability of the procedure and to carry out the postoperative treatment. His more intimate knowledge of the lachrymal apparatus is also a decided aid.

OPERATIVE TECHNIQUE

The technique of the operation is as follows:

At the time of the tear sac operation, or two weeks previously, any septal deviations and the anterior tip of the middle turbinate are removed; under local anesthesia, preferably. If this is not done adhesions will result from working in a narrow nose and will defeat the purpose of the operation. An incision is now made one centimeter from the inner canthus and parallel to the bridge of the nose. A curved incision or one closer to the inner canthus may result in a bowstring scar and must be avoided. The incision may be from one to three centimeters long, depending on the operator's preference. We prefer a large incision, as the scar is not bad.

The sac is lifted from its bed easily by working from above, downward and forward. Any other route of approach is apt to prove troublesome. The periosteum is always adherent at the inner canthal ligament.

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The anterior ethmoidal artery may be ligated if desired. We have not done this routinely, and in only one case was the bleeding troublesome. A Mosher ethmoid curette is now plunged through the soft lachrymal bone and the opening enlarged in all directions by means of Kerrison Rongeurs, Kofler ethmoid, and Grunewald ethmoid forceps. All blocking ethmoid cells and anterior superior overhang of the middle turbinate are carefully removed.

The medial half of the sac and the upper portion of the nasolachrymal duct are carefully removed with sharp scissors so that the lateral half of the sac remains as a disk with the punctum in its middle. Care should be taken to avoid any pouching at the margins. Closure of the wound is made with interrupted black silk sutures through the skin only, except for the suture in the exact middle of the incision which includes the deeper tissue. These may be removed in forty-eight hours.

Early postoperative lavage is important, as it keeps the canal clean and prevents possible adhesions or inflammation around the opening into the nose.

The following is a résumé of the first fourteen operations. These have been observed postoperatively for at least six months, so that we feel justified in reporting the results as final. With the exception of one case, all have been seen or communicated with during the last month. In two of the cases reported a bilateral operation was done, with an interval between operations.

RESULTS OF CASES

Case 1.—Charles G., age 10. Had discharge and watering from left eye for past four years. Has had long series of probing by various men, but without results.

Left eye showed a chronic suppurative dacryocystitis. No stricture between punctum and sac.

On May 29, 1927, Toti-Mosher operation was performed with excellent results. Complete disappearance of symptoms.

* * *

Case 2.—Mrs. G. T., age 62, complained of discharge and watering of left eye for a number of years. No previous treatment had been given. Left eye showed a marked chronic suppurative dacryocystitis. No stricture between punctum and sac. Toti-Mosher operation, December 31, 1927. Initial results good, no epiphora or discharge. Patient returned February 28, 1928, with return of symptoms.

It was impossible to lavage through into the nose, and pressure over the site of tear sac expressed pus. A probe inserted struck against a bony obstruction; if the nasal end of the probe was slightly tilted down it passed into the nose. The condition persisted in spite of treatment, and it was found necessary to extirpate the remaining portion of the lachrymal sac. This was followed by primary healing. The failure in this case can be attributed to the opening into the nose being at too low a level.

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Case 3.—Mrs. S. D., age 48, has had epiphora of the left eye for about one year, due to a stricture of the nasolachrymal duct. She was operated upon February 10, 1928, with complete relief of symptoms.

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Case 4.—Mary S., age 40, has had epiphora for three years, accompanied by discharge of pus from sac upon pressure. Has had a long series of probings without result. Right eye showed a chronic suppurative dacryocystitis with obstruction of the nasolachrymal duct. Was operated upon February 10, 1928, with excellent results.

* * *

Case 5.—Mrs. R. H., age 44. Eight years ago was in automobile accident and received fracture of bones of face and nose. Since then both eyes water and pressure in corners of nose expresses pus into both eyes. Had bilateral chronic suppurative dacryocystitis. On May 1928, markedly deviated septum operated upon. On June 30, 1928, left eye was operated upon, and on August 28, 1928, the right eye. Results excellent in both eyes, with disappearance of symptoms. Because of the previous multiple fractures about the nose, some difficulty was encountered during the operation.

* * *

Case 6.—Mr. T. B., age 27. Was seen in clinic, May 1927, with obstruction of nasolachrymal duct of the right eye. This was probed for a period with relief of symptoms for six months. In June of 1928 the stricture of the nasolachrymal duct was again present and patient was operated upon. The immediate results were good, and up to the end of July, a period of about six weeks, the patient was free of symptoms. At this time patient left San Francisco and has not been seen since.

* * *

Case 7.—Mr. E. M. Has had watering of left eye for a number of years. The tear duct has been probed but without success. On January 1928, Toti-Mosher operation was performed. Results were good.

* * *

Case 8.—Mary K., age 45. Right eye tear duct closed for two and a half years; has had several long series of probings without relief. On October 23, 1928, Toti-Mosher operation was performed, with relief of symptoms.

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Case 9.—Susan D., age 50. Right eye watered and discharged for a number of years. Had right-sided chronic suppurative dacryocystitis. Was operated upon October 5, 1928, with disappearance of symptoms.

* * *

Case 10.—Violet M., age 40. Had right-sided chronic suppurative dacryocystitis of four years' duration. There was a slight constriction of the canal just before the sac. This showed no tendency to increase over a period of six months; we therefore performed an operation October 8, 1928. Up to the present time patient has remained free from symptoms.

* * *

Case 11.—Anna B., age 58. Has had epiphora of several years' duration in both eyes. Examination showed a bilateral chronic suppurative dacryocystitis with stricture of the nasolachrymal duct. On October 9, 1928, operation was performed on the left side, and on October 15, 1928, on the right side, with relief of symptoms on both sides.

* * *

Case 12.—Mrs. Mary K., age 40. Right eye has watered several years; has had series of probings. At the last series the pain was so severe that patient left her physician before he had finished. Examination showed stricture of nasolachrymal duct. Patient was operated upon in October 1928. Results were good, with disappearance of symptoms.

SUMMARY

In the series here reported, the Toti-Mosher operation has been performed fourteen times. With one exception, these patients have all been kept under observation from six months to two

years, and have all been seen or communicated with during the last month. Of this series there has been only one failure, and this, as previously explained, was due to faulty technique.

Five of these patients had been probed over varying amounts of time without relief.

In presenting our results, we realize that it is rather a small series of cases from which to draw conclusions. The results, however, have been sufficiently good to warrant our belief that, in properly selected cases, the Toti-Mosher is the operation of choice.

384 Post Street.

DISCUSSION

M. F. WEYMANN, M.D. (903 Westlake Professional Building, Los Angeles).—Doctors Cordes and Martin are to be congratulated upon the high percentage of cures in their series. Their success is undoubtedly due to exact observance of the details of technique. I agree with them that extirpation of the sac is still the operation of choice before intra-ocular operation, and in individuals where the puncta or canaliculi have been damaged, or where the sac is excessively scarred. There can be no question but that we should prefer dacryocystorhinostomy in selected cases, and the cases suitable for this operation will be much greater in number if we discontinue such mutilating procedures as slitting the canaliculi and forcible probings before recommending dacryocystorhinostomy. X-ray photography of the sac after filling with bismuth emulsion, as described by Ewing, should be of assistance in the selection of cases. Having decided that operation is needed, the question arises which of the several procedures for dacryocystorhinostomy offers the best chance of success. The main types are the intranasal operation of which the West is an example, and the combined external and internal procedure of which the Toti-Mosher and the Dupuy Dutemps operations are examples.

Wojatschek reports twenty-two successes out of thirty-two West operations and four successes out of nine Toti operations. There is no difference in the cosmetic result. By success I mean cure of infection and epiphora. Harrison reports twelve successes out of fifteen West operations which were followed for some period of time. Gillum observed three cases treated by the West operation, which remained cured after nine years. Hessberg found only four patients out of thirty-five operated by the Toti procedure who showed lacrimation. Lange reports twenty-three cures out of twenty-nine operations with the Toti procedure. He believes it equal to the West and easier to do. Erik Knutson reports eighty per cent of cures out of sixty-one West operations. Dupuy Dutemps in 1924 reports 299 operations by his technique with 92.3 per cent cures. However, only twenty-seven cases were observed over one year. This operation is very similar to Mosher's modification of Toti's procedure. Doctor Mosher, in a recent communication, reports successful cure of pus infection and tearing in 85 per cent of cases operated at the Massachusetts Eye and Ear Infirmary by his technique. He stresses the removal of the anterior ethmoid cells and the correction of high deviation of the septum, if present.

From an analysis of the above figures we may conclude that any of the well-accepted procedures offers about 80 per cent chance of successful cure. Toti himself in 1927 describes the modifications and various procedures for dacryocystorhinostomy and states that it remains to be determined which procedure is best. It would seem that we need not fear to advise any of the above methods; the greatest success will follow the use of that technique in which an operator is most proficient.

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RODERIC O'CONNOR, M. D. (1904 Franklin Street, Oakland).—This paper is complete, and no one who has had experience with the unmodified Toti can disagree with it in any respect.

Therefore, in describing my results and troubles with the unmodified Toti, the intention is to emphasize the following statements made in the paper:

1. The importance of teamwork with the rhinologist. In seven of my fourteen operations, repeated S. O. S.'s for intranasal help were necessary. Much of this trouble probably could have been avoided had the intranasal work been done as a preliminary. The prolonged after-care in these seven cases was so annoying that I have not performed the operation since before Mosher announced his modification.

2. Early postoperative lavage is most important. In this connection I might be able to add one idea in regard to the pressure dressing advised by Toti. In my early cases this was used with several temporarily occluded canaliculi resulting. So it was abandoned for a simple protective dressing, with early probing and lavage.

As it happens my total number of operations is the same as that listed in this paper (fourteen). Out of this number there was one failure to relieve the epiphora and in this one, fluid could be syringed freely into the nose. In none was extirpation of the sac required. While on this thought I might mention that I prefer to us Gifford's destruction of the sac lining by trichloracetic acid. It gives uniformly successful results, can be done as an office procedure, the patient loses practically no time, and it costs him much less in other respects.

I feel sure that this paper is going to encourage me to again take up intranasal drainage of the lacrymal sac, and for that encouragement I wish to thank the authors.

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H. J. HARA, M.D. (432 South Boyle Avenue, Los Angeles).—Some years ago Dr. H. P. Mosher reported in the *Annals of Otology, Rhinology, and Laryngology* the analysis of the follow-up work in those cases of chronic dacryocystitis in which the Toti-Mosher operation was performed at the Massachusetts Eye and Ear Infirmary. He reported 90 per cent cure for suppuration and 75 per cent relief for epiphora.

I have recently returned from Doctor Mosher's clinic. During my stay there, extending over a period of a year, I have had ample opportunity to observe a number of these cases of chronic dacryocystitis both before and after the operation, and am quite certain that in these later cases his results are still better.

The literature sheds little light on the pathogenesis. Primary dacryocystitis is said to be rare. In the series I have studied at the infirmary, about one-third of the cases were among Italian women. Experience has shown that these particular people are notoriously subject to disorders of the nose and paranasal accessory sinuses. Might not, then, the underlying factors that bring on the disturbance of the normal function in the nose and throat also play a part in the causation of the dacryocystitis? Viewed in this light, the problem is for the rhinologist as well as the ophthalmologist.

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BARTON J. POWELL, M.D. (Medico-Dental Building, Stockton).—Doctors Martin and Cordes have accomplished a service in reporting these cases. They have given encouragement to those of us who are seeking a better method for the relief of these unfortunates. Acknowledging that the usual method of slitting, probing and syringing is not only painful, slow and too often unsatisfactory, the oculist has constantly sought something better.

Meller of Vienna, an instructor of many of us, taught us to extirpate the sac and curette the duct. After following this teaching for many years, it too was found more or less a failure.

In a limited number of cases my associate and brother, Dr. Dewey R. Powell, and I, have been using the Toti-Mosher operation and intend to follow up this procedure in the future in selected cases.